

**Transforming ‘the Beyond’ from Enemy to Ally:
Methodological Suggestions for the Dialogue between Science and the Spiritual Quest**

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It’s an intriguing title for a volume: “Science and Beyond: Cosmology, Consciousness and Technology in the Indic Traditions.” On first hearing, it resonates as the ideal sort of topic for scientists and philosophers to explore together. After all, science continually strives for a knowledge of the world that is ‘beyond’ what is currently known. And ‘the Beyond’ has always been an important motif from a religious perspective. Religions have always been drawn to what is deeper, higher, or more Real than everyday appearances (*maya*). Can there be any question that the spiritual quest, in all its guises, pursues insight and understanding ‘beyond’ that of everyday realities?

At the same time, it’s a perplexing title. One wants to know first of all: why this strange focus on ‘the Beyond’? What is it, and why is it important? There are so many ways to relate science and the Beyond. Which of the dozens of possibilities do the editors really intend as the book’s title: The Tension between Science and the Beyond? The Impossibility of Separating Science and the Beyond? Science Pointing to the Beyond? Science Dependent on the Beyond? Science Trumped by the Beyond? Science in Service of the Beyond? Science Excluding the Beyond (there *is* no beyond for science)? Science Redefined in terms of the Beyond? The Beyond Beyond Science?

Many of the authors will stress the importance of the Beyond from a spiritual perspective and will offer their insights into its nature. Mine is a more humble task. I wish merely to ask, Why would ‘the beyond’ matter from a scientific perspective? What changed in 20th-century science that would make this topic an appropriate one for a science-oriented symposium? The scientifically-minded person senses that there is an important question here. But the topic also raises red flags and calls out for caution: is it merely an excuse to smuggle religion in through the back door? How can the discussions be pursued in such a way that the strengths of science, and the intellectual prerequisites for doing good science, are not lost in the process?

With these concerns in mind, I propose five methodological parameters for any discussion of science and the beyond:

(1) Modern science originally defined itself by setting boundaries and excluding non-science, in order to bring all knowledge under its sway. Metaphysics and religion thus became its chief opponents. The record shows, however, that this attempt at boundary setting was fundamentally unsuccessful. Any serious dialogue must begin with a clear recounting of the limits that science itself has encountered.

Boundaries draw us. Important things happen at the boundaries, and most of the significant questions are decided there. Already the Greeks saw this: the limits or boundaries are what make the object beautiful; *they* make the argument rational. Nature abhors the infinite, *to apeiron*, because it is the boundaryless. Indeed, boundaries are constitutive of being. Perhaps that's why there is such interest today in the boundary lands where science and spirituality meet and overlap. We sense that we would really know what science is, what religion is, if we could only know how they are different, how the one limits the other.

For awhile, of course, modern humans thought that science might be boundary-less. Such silly ideas still corrupt the pages of some of our science journals and help desperate authors sell copies of their books. But recent history teaches a rather different lesson. There was a time, of course, when Newton's laws seemed to reign supreme, when it was believed that all could be reduced to 'particles in motion,' when the universe seemed to lack beginning or end, and when men of science believed that knowing the laws of nature would allow them eventually to reduce all events to states of physical matter and energy. But today that reductionist vision of the world is collapsing into rubble around us.

The collision of the individual sciences with their various concrete limits would require a talk of its own: relativity theory introduced the speed of light as the absolute limit for velocity, and thus as the temporal limit for communication and causation in the universe; Heisenberg's uncertainty principle placed mathematical limits on the knowability of both the location and momentum of a subatomic particle; the Copenhagen theorists came to the startling conclusion that quantum mechanical indeterminacy was not merely a temporary epistemic problem but reflected an *inherent* indeterminacy of the physical world itself; so-called chaos theory showed that future states of complex systems (like weather systems) quickly become uncomputable because of their sensitive dependence on initial conditions — a dependence so sensitive that a finite knower could *never* predict the evolution of the system, which is a staggering limitation when one reflects on what percentage of natural systems exhibit chaotic behaviors; Kurt Gödel showed in a well-known

proof that mathematics cannot be complete ... and the list goes on and on and on.

Emergence theory now suggests that nature is ‘upwardly open.’ The behavior of a squirrel or monkey requires monkey-level explanations; one can only explain the hard work of a dancer or musician in terms of the standards of music and dance — not the standards of physics. If emergence theorists are right, the upwardly-open nature of human consciousness, characterized as it is by the progression from one idea to the next, offers a powerful example of a phenomenon *within* the natural world that points *beyond* the level of material or physical explanation alone (although any scientific theory of consciousness is still constrained by the limits of physics). And just as the neurophysiological structure of the higher primates is upwardly open to the emergence and causal power of the mental, so the mental or cultural world may be upwardly open to types of influence we can only call spiritual.¹

(2) No compartmentalized approach to knowledge can comprehend the limits of science and what lies beyond them. Disciplinary-bound methods cannot describe disciplinary boundaries. Instead, the task requires a mode of discourse that is both rigorous and at the same time not afraid to cast into question hegemonic claims to knowledge — be they religious or scientific. Our challenge is to find a synthetic vision that encompasses multiple fields of science as well as multiple religious traditions. How else could one address the two main topics of this book, cosmology and consciousness?

Interdisciplinarity — the task of working across disciplines — is a funny one. Scientists around the world are strongly discouraged from engaging in it. Yet, ironically, one can do it well only if one really is a master in at least one specific discipline. Unfortunately, interdisciplinary discussion is somewhat like a drug: most scientists eschew it, but those who become ‘users’ sometimes have difficulty regulating its use. The dosages become larger and larger; the heady generalizations over multiple disciplines give one the sense of floating comfortably over huge expanses of the cosmos; and soon the once-cautious scientist is making truth claims about Reality-as-a-Whole. Or, if I may change the metaphor, interdisciplinary discussion is like stepping into a cold river: many are afraid to get into the water at all. Those who do tend to jump in all at once

¹ For examples of recent works on emergence theory, see Harold Morowitz, *The Emergence of Everything: How the World Became Complex* (New York: Oxford University Press, 2002) and Niels Gregersen, ed., *From Complexity to Life: On the Emergence of Life and Meaning* (New York: Oxford University Press, 2003). More popular presentations include John Holland, *Emergence: From Chaos to Order* (Cambridge, MA: Perseus, 1998); Roger Lewin, *Complexity: Life at the Edge of Chaos* (Chicago: University of Chicago Press, 1992); and Steven Johnson, *Emergence: The Connected Lives of Ants, Brains, Cities, and Software* (New York: Touchstone, 2001). By the present author, see *The Emergence of Spirit*, forthcoming (2004).

... and are sometimes carried away by the current.

The way to navigate the interdisciplinary river is to step in slowly, never losing contact with the shore of one's own home scientific discipline. One begins with a single pair of related disciplines, preferably closely related to one another (physics and biology) rather than scientifically distant (cosmology and consciousness). One should require that all participants in the discussion be experts in one of the disciplines and conversant with the other. Participants in the discussion must make only statements about their connections that experts from both disciplines will accept. Only when some agreement on these two disciplines has been achieved is it safe to introduce a third discipline. One can then repeat the same careful process with this new discipline. Hence one now needs experts from all three disciplines at the table, with each participant comprehending and respecting both of the other disciplines. Only through such a gradual process can one support statements about the unity of the various disciplines; to jump too quickly to 'the unity of all knowledge' is to run the risk of leaving science itself behind.

'All is information,' the pundit proclaims. Well, perhaps; let's find out. We know something about physics and information, since leading physicists describe quantum theory in fundamentally information-based terms.² Do we know anything about the role of information in biology? 'Biological information' has been given a rigorous formulation in the new subdiscipline of 'systems biology.' In recent years systems biologists have given an information-theoretical formulation of the levels in life's "complexity pyramid."³ Construing cells as informational networks of genes and proteins, systems biologists distinguish four distinct levels: (1) the base functional organization (genome, transcriptome, proteome and metabolome); (2) the metabolic pathways built up out of these components; (3) larger functional modules responsible for major cell functions; and (4) the large-scale organization that arises from the nesting of the functional modules. Oltvai and Barabási conclude that "[the] integration of different organizational levels increasingly forces us to view cellular functions as distributed among groups of heterogeneous components that all interact within large networks." Likewise, Milo *et al.* have recently shown that a common set of "network motifs" occurs in complex networks in fields as diverse as biochemistry, neurobiology and ecology. As they note, "similar motifs were found in networks that perform information processing, even

² See, for example, Anton Zeilinger, 'Why the Quantum? It from Bit? A Participatory Universe? Three Far-Reaching, Visionary Questions from John Archibald Wheeler and How They Inspired a Quantum Experimentalist,' in by John D. Barrow, Paul C.W. Davies, and Charles L. Harper, Jr., *Science and Ultimate Reality: Quantum Theory, Cosmology and Complexity* (Cambridge University Press, 2003).

³ Zoltán Oltvai and Albert-László Barabási, "Life's Complexity Pyramid," *Science* 298 (2002): 763-64; cf. Barabási, *Linked: The New Science of Networks* (Cambridge, MA: Perseus Books, 2002.)

though they describe elements as different as biomolecules within a cell and synaptic connections between neurons in *Caenorhabditis elegans*.”⁴

Now, what are the connections between the use of ‘information’ in these two fields? In order to find out, we need to convene a group of physicists, biologists and philosophers to explore the question (perhaps again at NIAS!). The process may seem laborious to those who seek quick answers. But if the ‘science’ in ‘science and beyond’ is not to be obscured, such careful consideration of what is already known will be an indispensable condition for progress.

In sum, one must learn to wait on the synthetic vision like one waits for the final note of a beautiful composition, or on the next dish in an excellent South Indian meal. If one introduces the synthetic vision too early, one brings the entire process to a screeching halt. Perhaps what is needed is a Kama Sutra for interdisciplinary work. Yes, the synthetic vision brings great pleasure and is the final goal of the process; but it is most pleasurable, and most profound, when it is pursued with constant self-constraint and self-control.

(3) ‘Science and the spiritual quest’ is inherently self-involving. In this dialogue the scientist cannot leave him- or herself aside, as he or she might when doing normal bench science. New habits of mind are required to explore the possible connections between science and spirituality, for here the self plays a role as inner compass which is unfamiliar to most practicing scientists.

For example, it is relevant that I am from the West. That I am a male and a professor. That I earn enough money to own a car and a computer. That my father and mother were atheists and that I was brought up in a home without any religious training. That in my home religious belief was viewed with suspicion, whereas scientific thinking and progress were celebrated with excitement. Finally, it’s relevant that I found my life meaningless in a purely physical world, a world without spirit; and that I found in Christianity a set of beliefs and spiritual practices that addressed this emptiness.

These are highly personal statements. If one speaks in this way at a conference on astrophysics or molecular genetics, one will only embarrass his audience. The auditors will rightly complain that one is being ‘inappropriately personal.’ And yet, if the theme of ‘science and the spiritual quest’ is intensely self-involving, as appears to be the case, then each speaker will have to include his or her story as well if the reader is really to understand his or her position.

⁴ See R. Milo *et al.*, “Network Motifs: Simple Building Blocks of Complex Networks,” *Science* 298 (2002): 824-27.

(4) *Progress in the new dialogue between science and spirituality requires a partnership between science and philosophy, for there is no 'theory' of science and religion that is not mediated through philosophy. Such a partnership remained underdeveloped in the West until recently, though it has had long had a place in the Indic Traditions.*

I will not say more in this essay about the philosophical theories that most successfully mediate between science and spirituality, since among the authors in this book are some of the world's foremost experts on this topic. Taken together their essays show, I believe, that a new partnership between science and spirituality, mediated through metaphysics, is possible. In fact, this new metaphysical quest may represent the most exciting intellectual project of the 21st century. Moreover, there is no escape from it, because science itself plunges us into metaphysical questions. The resulting insights will alter, if not rewrite, many of the great metaphysical systems of the past, those from the East *and* West.

A word of caution might be allowed: real partnerships exist only when the partners are genuinely equal. But past experience suggests that there is a serious danger that metaphysics will engage in an unintentional take-over of discussions on this topic. To scientists, such a move looks like a hostile take-over bid.

Yet there is a way for the other stakeholders, and for science in particular, to prevent a take-over of the discussion by metaphysics. I submit my recommendation under the heading of 'the three quests.'

(a) *The scientific quest.* It is standard to speak of science as a quest. Research scientists know they are engaged in a never-ending task. Great scientists are the ones who continually turn their eyes beyond the well-tended gardens of successful theories; their attention inevitably fixates on the wild jungles of anomalous phenomena that confront current theories.

(b) *The spiritual quest.* In many places in the world, perhaps even some places in India, readers might laugh when they encounter the phrase 'the spiritual quest.' (Indeed, in some places the response might be rather more hostile than laughter.) And yet engaging in spiritual practices represents a quest that is equally as unending as the scientific quest. A famous passage in the Christian scriptures beautifully expresses the longing for what is not yet: 'Now we see in a glass darkly; then we shall see face to face. Now I understand in part, but then I shall understand fully, even as I have been fully understood' (1 Cor. 13:12). How deep a longing is expressed by the Jewish longing for the coming of Messiah. Persecuted, spread across the world in the diaspora, Jews would say as they parted from friends, 'Next year in Jerusalem!' That beautiful phrase expresses the acute longing for the end of waiting, the end of the Jew's mystifying separation from

his homeland, the end of longing for an age when God will no longer turn his back on the suffering of his people, will no longer be deaf to their cries. ‘Next year in Jerusalem!’ And how deep is the longing that the Sufi mystics express, the longing to know the mysteries of the divine whose glory always exceeds whatever the mystic comprehends. I hear the same longing in the beautiful words that the mystic uses in the final book of the New Testament: ‘And I saw a new heaven and a new earth; for the first heaven and the first earth passed away, and there is no longer any sea.... [God] shall wipe away every tear from their eyes; and there shall no longer be any death; there shall no longer be any mourning, or crying, or pain...’ (Revel. 21:1, 4).

Spirituality lives for those in diaspora, for those who seek another kingdom. It lives for those who dwell ‘behind the veil of tears,’ separated from ultimate reality by illusion, passion, selfishness, and error. The Vedantic texts speak profoundly about the curtain of *maya*; I do not need to remind the readers of this book of their teachings. Spirituality too is a quest, no less than science.

(c) In face of these first two quests, why is it then that many speak with such certainty when it comes to metaphysical answers? Metaphysics, according to one definition, is that conceptual structure which bridges the space between (present) scientific conclusions and the religious beliefs that accompany our spiritual practices. I need not remind you what a space it is between science and religion! Often it appears to be a valley, indeed, a *chasm* between two worlds. If both science and religion are quests, and metaphysics is the attempt to build conceptual bridges between them, how can metaphysics be anything other than the most precarious of quests?

My fourth point, then, is a plea for humility in metaphysics — for caution, for tentativeness. We *know* that science is in flux, that tomorrow’s data may overturn today’s theory. And religious differences suggest that certainty claims in this field are suspect as well. May our metaphysics be *no less* hypothetical than our science!

(5) *What scientists can bring to this debate is a hard-mindedness often lacking in theology and interreligious dialogue. Philosophers and religious scholars have important methodological lessons to learn from the way that scientists approach their work.*

I would like to conclude this short paper with apparent heresy: if we remove the tension between science and ‘the beyond,’ we lose the driving force behind the discussion of these topics. This statement might seem heretical in a book which is dedicated to reducing the tension between science and spirituality. But reducing tensions and removing tensions are not the same.

One is familiar enough with meetings enough of religious leaders who plead for the modern world to forsake science and to return instead to religious truths and spiritual insights. ‘Instead’ is

the key word here. Surely the voices of our religious leaders are valuable as a corrective. But they do not express what a group of authors who are scientists and philosophers has uniquely to offer. Such a group has the capacity to build exciting new bridges, albeit tentative ones, between science and spirituality. And not just imaginary bridges. Because many in the science-spirituality dialogue are experts in both the sciences and the spiritual traditions, books like the present one have the potential to develop sophisticated accounts of where the new bridges should be built, to propose precise architectural plans, if you will, of what conceptual structures can support them. In principle, these authors can help to resolve the hard conceptual issues of cosmology and consciousness — and the equally hard ethical issues raised by technology today.

But authors in this field face a monstrous danger. Often I fear that the odds are greater that we will succumb to the danger than that we will overcome it. It is the danger that one will ‘reconcile’ spirituality with pseudo-science, that is, with a watered-down version of science rather with the actual results and methods of the empirical sciences. To reconcile spirituality with science the way one *wishes* science were is like dismissing an opponent based on weaknesses one wishes he had. Or, to use a gentler metaphor, it’s like having a perfect relationship with a woman who exists not in reality but in one’s imagination alone — as in the famous Greek myth of Pygmalion, who created a marble statue of a woman so beautiful that he fell in love with her.

Let there be a wedding of science and spirituality, but let it begin with real partners, with all their flaws and blemishes — but also with their real strengths. Readers of this volume know far better than I what are the strengths of the Indic traditions; and there are analogous strengths in the Western spiritual traditions as well. Let’s keep the strengths of the sciences equally in mind:

- * *testable theories*: the scientific community can eventually agree on what are the more and less successful theories;
- * *public data*: the experiments used to test theories can be replicated by any group of researchers in the field;
- * *culture-independence*: one’s native language and culture neither exclude her from contributing to scientific progress nor give her special access to the truth;
- * *traceable causal histories*: science works because the causal histories for each of the phenomena it studies are accessible in principle to intersubjective (communal) examination.

These four features describe the human activity that one is addressing when one accepts the challenge of ‘science and beyond,’ and it’s to this science that one must repeatedly return. May the participants in this fascinating dialogue be granted wisdom and intuition — but also precise empirical knowledge, crisp analysis, and theoretical acuity — as they seek understanding of reality

with deep humility and reverence.

